

REMARKS:

Applicant has carefully studied the nonfinal Examiner's Action of April 7, 2004, and all references cited therein. These explanatory remarks are believed to be fully responsive to the Action. Accordingly, this important patent application is now believed to be in condition for allowance.

Applicant responds to the outstanding Action by centered headings that correspond to the centered headings employed by the Office, to ensure full response on the merits to each finding of the Office.

New claims 59-66 are presented in response to this Office Action.

Claim Rejections – 35 U.S.C. § 103

Applicant acknowledges the quotation of 35 U.S.C § 103(a).

Claims 1-4, 12-13, 17-19, 30-33, 37, 41, 42, 46 and 47-48 stand rejected under 35 U.S.C § 103(a) as being unpatentable over Pollet et al. (U.S. 2002/0150071 A1) in view of Kato et al. (U.S. 2002/0105973 A1).

Claims 24-28, 29, 53-57 and 58 have been allowed. Claims 5-11, 14-16, 20-23, 34-40, 43-45 and 49-52 stand objected to as being dependent upon a rejected base claim, but the Office states that they would be allowable if rewritten in independent form including all of the limitations of the base claims and any intervening claims.

Regarding claims 1-4, the Office contends that Pollet discloses an improved initialization method for a communication system comprising, estimating a timing offset utilizing correlation with an entire received DMT frame comprising a plurality of DMT frames at pg. 1, paragraph [0004]. The Office additionally states that Pollet fails to disclose utilizing correlation for performing estimating a timing offset. The Office contends that Kato et al. discloses that frames can be slightly misaligned as a result of timing offset, wherein a frame can be extracted from the received signal at pg. 2 [0026] to pg. 3 [0027] and that it would have been obvious to one having

ordinary skill in the art at the time the invention was made to receive a timing offset by correlating the received frame such as a DMT frame as taught by Kato et al. into the teachings of Pollet et al. in order to establish synchronization.

Applicant respectfully traverses the finding of the Office.

Claim 1 of the present invention claims an improved initialization method for a communication system comprising the steps of estimating a timing offset, the timing offset including an integer timing offset and a fractional timing offset, by correlating an entire received DMT frame with a pre-determined frame. It is known in the art that the timing offset for synchronization includes an integer timing offset and a fractional timing offset. As disclosed in the specification at paragraph [0044] the entire received DMT frame comprises N samples. The present invention performs a correlation with a pre-stored frame utilizing these N samples to estimate the timing offset. The correlation function used is shown in Fig. 3-1. The key concept of correlation is to compare the N samples of the DMT frame with the samples of a pre-stored frame and to select the delay where the correlation function has the maximum value. By definition, correlation is a non-data aided method. As detailed at pg. 2 of the present invention, data-aided synchronizers use the receiver's decisions or a training sequence to compute the timing offsets. By contrast, non-data-aided synchronizers operate independent of the transmitted information sequence. For the NDA approach, the timing estimates maximize the NDA likelihood function, which is obtained by averaging the likelihood function over the random information variables.

Pollet describes at pg. 1, paragraph [0004], that in order to estimate the timing error, a common method is applied to DMT using a data-aided algorithm wherein the sampling clock is first roughly synchronized, and at least one tone or carrier, the position in the complex plane, of the detected symbol is compared with the position in this plane of the signal at the input of the decision device, and this comparison provides a phase error which is used for correction. As such, the method as described by Pollet utilizes a data-aided algorithm, which is not equivalent to the non-data aided correlation method as disclosed and claimed by the present invention. As such, Pollet does not describe estimating a timing offset utilizing correlation with an entire received DMT frame as claimed by the present invention.

Pollet further describes at pg. 1, paragraph [0008] utilizing a Mueller and Muller estimation as is known in the art. The Mueller and Muller timing error estimator is known as employing an algorithm requiring one sample per symbol. The error term in accordance with The Mueller and Muller timing error estimator is calculated according to equation (1) in paragraph [0009] of Pollet. As such, the Mueller and Muller timing error estimation described by Pollet is not equivalent to the timing offset estimation utilizing correlation with an entire received DMT frame as disclosed and claimed by the present invention.

Kato describes at pg. 2 [0022] an improved slot synchronization system and method wherein synchronization relies on an average correlation over multiple frames between a 14-symbol samples signal sequence and a known sync word stored in the receiver. As described in the background of the invention, time slot synchronization is used to establish the boundaries of the received frame. Kato goes to the describe other time slot synchronization methods known in the art such as 8-times oversampling. Accordingly, it is known in the art to utilize correlation with oversampling to provide time slot synchronization. Correlation for the purpose of synchronization is a non-data aided method. As described in detail by Kato, correlation utilizes successive sampling of a baseband signal comprising a plurality of frames, wherein each frame comprises a plurality of symbols. The samples are correlated against a symbol stored at the receiver. The steps are performed prior to FFT and therefore the data is not available and not necessary for the implementation of this non-data aided method.

The method described by Pollet is a data-aided method for estimating a timing offset and the method described by Kato is a non-data method. As such, it would not be obvious to one skilled in the art to combine the initialization described by Pollet with the synchronization method described by Kato to establish an improved initialization method including estimating a timing offset utilizing correlation with an entire received DMT frame utilizing correlation as disclosed and claimed by the present invention. By contrast, it is not technically possible to combine the data-aided method described by Pollet with the non data-aided method described by Kato. The technique described by Pollet requires that the symbols be processed through FFT and the data available to perform the synchronization. The method described by Kato occurs prior to FFT and the determinaton of the data because the method does not utilize the data for synchronization.

For the reasons cited above, Applicant believes that independent claim 1 is patentable over Pollet et al. in view of Kato et al. and is believed to be in condition for allowance.

Claims 2-4 and 8 are dependent upon claim 1, and are therefore allowable as a matter of law.

Claim 12 is similar to claim 1. For the reasons cited above with regard to claim 1, claim 12 is believed to be in condition for allowance. Claim 13 is dependent upon claim 12 and is therefore allowable as a matter of law.

Claim 17 is similar to claim 1. For the reasons cited above with regard to claim 1, claim 17 is believed to be in condition for allowance. Claims 18-20 are dependent upon claim 17 and are therefore allowable as a matter of law.

Claim 30 is similar to claim 1. For the reasons cited above with regard to claim 1, claim 30 is believed to be in condition for allowance. Claims 31-33 and 37 are dependent upon claim 30 and are therefore allowable as a matter of law.

Claim 41 is similar to claim 1. For the reasons cited above with regard to claim 1, amended claim 41 is believed to be in condition for allowance. Claim 42 is dependent upon claim 41 and is therefore allowable as a matter of law.

Claim 46 is similar to claim 1. For the reasons cited above with regard to claim 1, claim 46 is believed to be in condition for allowance. Claims 47-58 are dependent upon claim 46 and are therefore allowable as a matter of law.

New claims 59-62 are dependent upon claim 1 and are therefore allowable as a matter of law.

New claims 63-66 are dependent upon claim 30 and are therefore allowable as a matter of law.

If the Office is not fully persuaded as to the merits of Applicant's position, or if an Examiner's Amendment would place the pending claims in condition for allowance, a telephone call to the undersigned at (727) 507-8558 is requested.

Very respectfully,

SMITH & HOPEN

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Dated: July 7, 2004

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CERTIFICATE OF FACSIMILE TRANSMISSION

(37 C.F.R. 1.8(a))

I HEREBY CERTIFY that this Amendment E is being transmitted by facsimile to the United States Patent and Trademark Office, Art Unit 2631, Attn.: Khai Tran, (703) 872-9314 on July 7, 2004.

Dated: July 7, 2004

Deborah Preza
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